

REMARKS

Claims 1-7 are all the claims pending in the application. Reconsideration and review of the claims on the merits are respectfully requested.

Claim rejections under 35 USC § 102, 103, and 112

In the last Office Action claims 1-4 inclusive were rejected under 35 U.S.C. § 102(b) as being anticipated by GB 1,459,781. Claims 1-3, 5 and 7 were rejected under 35 U.S.C. § 102(b) as being anticipated by Stewart et al. Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Stewart et al. in view of GB 1,459,781. Claims 1-7 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for lacking antecedent basis "cooling bottom".

Independent Claims 1, 2, 3 and 5 have been amended to more clearly define the present invention. Reconsideration and allowance of the application are respectfully requested in view of the following remarks.

Claims 1-3 and 5 are amended to replace "cooling bottom" with "collecting bottom", in accordance with the Examiner's suggestion. Applicants submit that Claims 1-7 more clearly comply with the requirements under 35 USC § 112.

Moreover, Claims 1-3 and 5 are amended to replace "cooling urea prills" with "cooling of so obtained urea prills" and the expression "by means of the bottom itself" is added after "collecting bottom".

As correctly indicated by the Examiner at page 4 of the Office Action (Response to amendments), the cooling of urea prills intended in the present invention is the further cooling of the solidified urea droplets (prills). In other words, as clearly described in the application, the melt urea droplets falling down in the prilling tower are first cooled (solidified) to obtain urea prills and then the so obtained urea prills are further cooled (hardened) before leaving the prilling tower.

Also the cited prior art documents, see for instance GB 1,459,781, page 3, lines 45-47, describes the further cooling of the solidified urea droplets (prills).

However, according to the present invention such a cooling takes place directly on the collecting bottom and by means of the bottom itself, which is appropriately cooled.

On the contrary, according to the prior art, the further cooling of the urea prills takes place by direct contact with a cooling fluid such as fluidizing air in a fluidized bed or with a liquid in a pool, both the fluidized bed and the pool being defined above the bottom of the prilling tower (see for instance GB 1,459,781, page 3, lines 50-54, page 4, line 84-85; Landis, column 3, lines 3-9; Stewart et al., column 2, lines 13-16, column 4, claim 1).

In other words, the cited documents clearly teach to further cool the urea prills in a cushion (see GB 1,459,781, page 3, lines 44-47), which is necessarily and unambiguously above the bottom of the prilling tower, i.e. it extends from such a bottom towards the ceiling of the tower for a certain thickness (in Stewart et al. the fluidized bed is one inch thick as indicated in claim 1). Moreover, the prills are cooled by direct heat exchange with the cooling fluid present in

the cushion that is with the fluidizing air in case of a fluidized bed or with the liquid in case of a pool.

In this respect, to state that the heat of the prills is transferred to the bottom, which in turn is cooled by the cooling fluid, is technically incorrect and groundless since a fluidized bed or a pool for cooling solid particles is exclusively designed and intended for a direct, convective, heat exchange between the cooling fluid and the particles and not for a conductive heat exchange with the bottom of the bed or of the pool.

In fact, in case of a pool, when the prills reach the bottom they have been already further cooled during their passage through the cooling liquid.

The same happens in a fluidized bed, where the solid particles behave substantially like liquid molecules in a stirred pool and the cooling function is carried out by the fluidizing air, which exchange heat by convection with the moving solid particles (prills). If it can happen from time to time that a prill hits the bottom of the prilling tower during its movements in the fluidized bed, it should, however, be excluded that such a contact results in a significant cooling of the prill since the residence time of the prill on the bottom (contact time) is infinitesimally short, and thus no effective cooling can take place by such a contact.

In other words, according to the prior art, the bottom has no cooling function, i.e. the urea prills are not cooled directly on the bottom by means of the bottom itself as in the present invention.

In this respect, the Examiner is requested to note that in the present claims the specific expression: "such that cooling of so obtained urea prills takes place directly on said collecting

bottom by means of the bottom itself', clearly and unambiguously refers to a conductive cooling of the prills on such a bottom only, thus excluding a previous cooling of the prills by other means such as by convention with a cooling fluid in a cooling cushion (pool or fluidized bed).

That is, contrary to the prior art, according to the present invention the collecting bottom indeed has a cooling function and is the only means responsible for the further cooling of the urea prills.

Contrary to what is stated by the Examiner at page 2 of the office Action, the coiled pipes described in GB 1,459,781 do not cool the bottom of the prilling tower but, on the contrary, as indicated at page 3, lines 64-67, further cool the fluidized bed, i.e. the cooling cushion. A bottom, which is a static element, cannot - by definition - be confused or compared with a fluidized bed, which is a dynamic system like a stirred pool, made of a plurality of suspended solid particles moving therein substantially like liquid molecules.

Although the bottom of the prilling tower according to Stewart et al. might be cooled by the fluidizing air passing through it, as seen above, this document is totally silent about the features of cooling the urea prills directly on the bottom and by the bottom itself.

With respect to Landis (page 4 of the Office Action), it is not correct to state that the urea prills lay directly on the bottom of the prilling tower. On the contrary, the prills are suspended above the bottom by the fluidizing air in the fluidized bed 12. In this respect, contrary to what is stated by the Examiner, reference 12 neither indicates a screen nor a bottom. Moreover, although the fluidized bed 12 is represented in figure 1 so schematically that it looks like some prills are directly (lay) on the bottom, Applicants point the Examiner to the fact that such an erroneous

interpretation would contradict the definition itself of the term "fluidized bed" and thus would be in clear contrast with the description. See also the description at column 3, lines 8-9 and figure 1, reference sign 13, wherein the cooled and solidified prills pass from the fluidized bed 12 into the overflow chute 13. This would have not been possible if the prills were laid down on the bottom instead of being suspended in the fluidized bed.

Concerning air booster compressors and fluidizing air refrigeration systems (page 4 of the Office Action, point 12), this machinery is referred to in the cited prior art, wherein the prills are further cooled in a fluidized bed. Such machinery cannot be present in the method according to claim 2 since, as seen above, urea prills are advantageously cooled directly on the collecting bottom instead of in a fluidized bed.

This machinery should be considered as additional, costly and high energy consuming machinery for the further cooling of the prills and cannot be confused or compared with the machinery required for the counter-current air flow in the urea droplets solidification step.

Therefore, the cited documents at least suffer from the drawbacks set forth at page 3, lines 11-13 of the present description (requirement of an air booster compressor and of an appropriate refrigerator system for said fluidising air flow).

The problem to be solved by the present invention is that of improving the prior art by providing a method and a device for obtaining cooled urea prills, which are simple to carry out, reliable and do not require high investment and operating costs (see present description, page 4, lines 1-4).

The claimed solution to the problem is neither disclosed nor suggested by the cited prior art for the reasons set forth above. Thus, present claims 1-7 should thus be considered patentable.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §102(b), §103(a) and §112, second paragraph.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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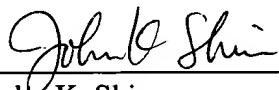
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